CLAIMS

1. A brightness control circuit for controlling the brightness of an optical cell, comprising:

   a sensor configured to provide a signal corresponding to the brightness of the optical cell;

   a control circuit connected to the optical cell and configured to adjust the brightness of the optical cell according to the sensed brightness of the optical cell.

2. A brightness control circuit according to claim 1, wherein:

   the control circuit includes a comparison circuit to compare the brightness signal to a target value; and

   the control circuit is configured to stop adjusting the brightness of the optical cell when the comparison circuit indicates that the brightness signal is within a selected range of or identical to the target value.

3. A brightness control circuit according to claim 2, wherein the control circuit further comprises an amplifier connected between the comparison circuit and the sensor and configured to amplify the brightness signal.

4. A brightness control circuit according to claim 1, wherein the control circuit is configured to overdrive the optical cell.

5. A brightness control circuit according to claim 1, wherein:

   the control circuit comprises a variable signal source to provide a varying signal to the optical cell to adjust the optical cell brightness; and

   the varying signal comprises at least one of an increasing and a decreasing ramp voltage.

6. A brightness control circuit according to claim 1, wherein:

the control circuit comprises a variable signal source to provide a varying signal to the optical cell to adjust the optical cell brightness; and

the varying signal comprises at least one of an increasing and a decreasing step voltage.

7. A brightness control circuit according to claim 1, wherein:

the control circuit comprises a current source to provide a current to the optical cell to adjust the optical cell brightness; and

the current source provides a current according to a difference between the brightness signal and a target value.

8. A brightness control circuit according to claim 1, wherein the control circuit includes:

a variable signal generator selectively connectable to the optical cell to provide a varying signal to the optical cell to adjust the optical cell brightness; and

a current source selectively connectable to the optical cell to provide a current to the optical cell to adjust the optical cell brightness.

9. A brightness control circuit according to claim 8, wherein the variable signal generator and the current source are selectively simultaneously connectable to the optical cell.

10. A brightness control circuit according to claim 1, wherein the sensor includes a resistor connected to the optical cell to sense the current provided to the optical cell.

11. A brightness control circuit according to claim 1, wherein the sensor includes a resistor connected between the optical cell and the control circuit.

12. A brightness control circuit according to claim 1, wherein the sensor includes a resistor connected between the control circuit and ground.

13. A brightness control circuit according to claim 1, wherein the optical cell includes a control transistor configured to control the brightness of the optical cell, and wherein the control transistor is configured to operate in a subsaturation region.

14. A brightness control circuit according to claim 1, wherein the sensor includes a resistor configured to be selectively connected to multiple optical cells.

15. A brightness control circuit according to claim 1, wherein:

the sensor includes a resistor connected to an optical element in the optical cell; and

the resistor is configured to be selectively connected to the control circuit.

16. A brightness control circuit according to claim 15, wherein :

the optical cell includes an OLED; and

the resistor is connected between at least one of (a) a cathode of the OLED and the source of a thin film transistor and (b) an anode of the OLED and ground.

17. A brightness control circuit according to claim 1, wherein the sensor includes:

a variable resistor, wherein the resistance of the variable resistor corresponds to the combined brightnesses of multiple optical cells; and

a current source connected to the variable resistor to provide a current to the variable resistor;

wherein the current source supplies only the variable resistor, the brightness signal includes a voltage across the variable resistor, and a sensitivity of the sensor may be increased by increasing the current provided by the current source.

18. A brightness control circuit according to claim 1, wherein the control circuit is configured to set the optical cell to a substantially known brightness before adjusting the brightness of the optical cell according to the sensed signal.

19. A brightness control circuit according to claim 1, wherein:

the optical cell includes a capacitor for storing a charge corresponding to the brightness of the optical cells; and

the control circuit is configured to discharge the capacitor to a substantially known charge before adjusting the brightness of the optical cell according to the sensed signal.

20. A brightness control circuit according to claim 1, wherein the control circuit is further configured to substantially maintain the adjusted brightness of the optical cell according to the sensed signal for a remaining duration of a row address cycle.

21. A brightness control circuit according to claim 1, wherein the control circuit:

includes a comparison circuit to compare the sensed brightness to a target value; and

the control circuit is configured to maintain the brightness of the optical cell within a selected range of or identical to the target value.

22. A brightness control circuit according to claim 1, wherein the control circuit:

includes a power source and a power sink; and

is configured to adjust the brightness of the optical cell according to the sensed signal by selectively connecting the optical cell to the power source and the power sink.

23. A brightness control circuit according to claim 1, wherein:

the sensor senses a first signal corresponding to a brightness of a first optical cell and a second signal corresponding to the brightness of a second optical cell; and

the control circuit independently adjusts the brightness of the first optical cell according to the first signal and the brightness of the second optical cell according to the second signal.

24. A brightness control circuit according to claim 1, wherein the optical cell comprises a liquid crystal cell.

25. A brightness control circuit according to claim 24, wherein the sensor comprises a node connected to an electrode of a liquid crystal cell.

26. A brightness control circuit according to claim 1, wherein:

multiple optical cells are configured in multiple columns and multiple rows; and

the control circuit includes a variable signal source to simultaneously provide a varying signal to the optical cells in multiple columns to adjust the individual brightnesses of the optical cells.

27. A brightness control circuit according to claim 1, wherein:

multiple optical cells are configured in multiple columns and multiple rows;

the sensor includes a column sensor connected to a column of optical cells, wherein the sensor is configured to sense a sequential signal corresponding to brightnesses of multiple optical cells in the column.

28. A brightness control circuit according to claim 1, wherein:

multiple optical cells are configured in multiple columns and multiple rows;

the sensor includes a column sensor connected to a column of optical cells, wherein the sensor is configured to sense a brightness sum signal corresponding to the sum of the brightnesses of multiple optical cells in the column.

29. A brightness control circuit according to claim 28, wherein the control circuit is configured to determine the brightness of a single optical cell in the column of optical cells according to a change in the brightness sum signal.

30. A brightness control circuit according to claim 1, wherein:

multiple optical cells are configured in multiple columns and multiple rows;

the sensor includes a light sensor responsive to multiple optical cells in a column; and

the light sensor provides a brightness sum signal corresponding to the sum of the brightnesses of the multiple optical cells in the column.

31. A display, comprising:

a display panel having multiple optical cells;

a sensor configured to sense a signal corresponding to a brightness of at least one of the optical cells; and

a control circuit connected to the at least one of the optical cells and the sensor, wherein the control circuit is configured to adjust the brightness of the at least one of the optical cells according to the sensed signal.

32. A display according to claim 31, wherein the control circuit:

includes a comparison circuit to compare the sensed brightness to a target value; and

is configured to stop adjusting the brightness of the at least one of the optical cells when the comparison circuit indicates that the sensed brightness is within a selected range of or identical to the target value.

33. A display according to claim 32, wherein the control circuit further comprises an amplifier connected between the comparison circuit and the sensor and configured to amplify the sensor signal.

34. A display according to claim 31, wherein the control circuit is configured to overdrive the at least one of the optical cells.

35. A display according to claim 31, wherein:

the control circuit includes a variable signal source to provide a varying signal to the at least one of the optical cells to adjust the brightness of the at least one of the optical cells; and

the varying signal comprises at least one of an increasing and a decreasing ramp voltage.

36. A display according to claim 31, wherein:

the control circuit comprises a variable signal source to provide a varying signal to the at least one of the optical cells to adjust the brightness of the at least one of the optical cells; and

the varying signal comprises at least one of an increasing and a decreasing step voltage.

37. A display according to claim 31, wherein:

the control circuit comprises a current source to provide a current to the at least one of the optical cells to adjust the brightness of the at least one of the optical cells; and

the current source provides the current according to a difference between the sensed brightness signal and a target value.

38. A display according to claim 31, wherein the control circuit includes:

a variable signal generator selectively connectable to the at least one of the optical cells to provide a varying signal to the at least one of the optical cells to adjust the brightness; and

a current source selectively connectable to the at least one of the optical cells to provide a current to the at least one of the optical cells to adjust the brightness.

39. A display according to claim 38, wherein the variable signal generator and the current source are selectively simultaneously connectable to the at least one of the optical cells.

40. A display according to claim 31, wherein the sensor includes a resistor connected to the at least one of the optical cells to sense the current provided to the at least one of the optical cells.

41. A display according to claim 31, wherein the sensor includes a resistor connected between the at least one of the optical cells and the control circuit.

42. A display according to claim 31, wherein the sensor includes a resistor connected between the control circuit and ground.

43. A display according to claim 31, wherein the at least one of the optical cells includes a control transistor configured to control the brightness of the at least one of the optical cells, and wherein the control transistor is configured to operate in a subsaturation region.

44. A display according to claim 31, wherein the sensor includes a resistor configured to be selectively connected to multiple optical cells.

45. A display according to claim 31, wherein:

the sensor includes a resistor connected to an optical element in the at least one of the optical cells; and

the resistor is configured to be selectively connected to the control circuit.

46. A display according to claim 45, wherein :

the optical cell includes an OLED; and

the resistor is connected between at least one of (a) a cathode of the OLED and the source of a thin film transistor and (b) an anode of the OLED and ground.

47. A display according to claim 31, wherein the sensor includes:

a variable resistor, wherein the resistance of the variable resistor corresponds to the combined brightnesses of multiple optical cells; and

a current source connected to the variable resistor;

wherein the current source supplies only the variable resistor, the sensed signal includes a voltage across the variable resistor, and a sensitivity of the sensor may be increased by increasing the current provided by the current source.

48. A display according to claim 31, wherein the control circuit is configured to set the at least one of the optical cells to a substantially known brightness before adjusting the brightness of the at least one of the optical cells according to the sensed signal.

49. A display according to claim 31, wherein:

the at least one of the optical cells includes a capacitor for storing a charge corresponding to the brightness of the at least one of the optical cells; and

the control circuit is configured to discharge the capacitor to a substantially known charge before adjusting the brightness of the at least one of the optical cells according to the sensed signal.

50. A display according to claim 31, wherein the control circuit is further configured to substantially maintain the adjusted brightness of the at least one of the optical cells according to the sensed signal for a remaining duration of a row address cycle.

51. A display according to claim 31, wherein the control circuit:

includes a comparison circuit to compare the sensed brightness to a target value; and

is configured to maintain the brightness of the at least one of the optical cells within a selected range of or identical to the target value.

52. A display according to claim 31, wherein the control circuit:

includes a power source and a power sink; and

is configured to adjust the brightness of the at least one of the optical cells according to the sensed signal by selectively connecting the at least one of the optical cells to the power source and the power sink.

53. A display according to claim 31, wherein:

the sensor senses a first signal corresponding to a brightness of a first optical cell and a second signal corresponding to the brightness of a second optical cell; and

the control circuit independently adjusts the brightness of the first optical cell according to the first signal and the brightness of the second optical cell according to the second signal.

54. A display according to claim 31, wherein the display panel comprises a liquid crystal display panel.

55. A display according to claim 54, wherein the sensor comprises a node connected to an electrode of a liquid crystal cell.

56. A display according to claim 31, wherein:

the optical cells are configured in multiple columns and multiple rows; and

the control circuit includes a variable signal source to simultaneously provide a varying signal to the optical cells in multiple columns to adjust the individual brightnesses of the optical cells.

57. A display according to claim 31, wherein:

the optical cells are configured in multiple columns and multiple rows;

the sensor includes a column sensor connected to a column of optical cells, wherein the sensor is configured to sense a sequential signal corresponding to brightnesses of multiple optical cells in the column.

58. A display according to claim 31, wherein:

the optical cells are configured in multiple columns and multiple rows;

the sensor includes a column sensor connected to a column of optical cells, wherein the sensor is configured to sense a brightness sum signal corresponding to the sum of the brightnesses of multiple optical cells in the column.

59. A display according to claim 58, wherein the control circuit is configured to determine the brightness of a single optical cell in the column of optical cells according to a change in the brightness sum signal.

60. A display according to claim 31, wherein:

the optical cells are configured in multiple columns and multiple rows;

the sensor includes a light sensor responsive to multiple optical cells in a column; and

the light sensor provides a brightness sum signal corresponding to the sum of the brightnesses of the multiple optical cells in the column.

61. A display system, comprising:

a display panel comprising multiple optical cells configured in multiple columns and rows, wherein each optical cell comprises:

a storage element for storing a value; and

an optical element configured to provide light according to the value stored in the storage element;

a plurality of sensors, wherein each of the sensors is configured to be responsive to a brightness of at least one of the optical cells in a particular column and provide a brightness signal substantially corresponding to the brightness of the at least one of the optical cells; and

a feedback circuit configured to be selectively connected to each of the optical cells in the particular column and the sensor connected to the particular column, wherein the feedback circuit is configured to adjust the value stored in each storage element in the particular column according to an input signal and the brightness signal from the sensor.

62. A display system according to claim 61, wherein:

the feedback circuit includes a comparison circuit to compare the brightness signal for the at least one of the optical cells to a target value; and

the feedback circuit is configured to adjust the value stored in the storage element of the at least one of the optical cells so that the sensed brightness signal is within a selected range of or identical to the target value.

63. A display system according to claim 62, wherein the feedback circuit further comprises an amplifier connected between the comparison circuit and the sensor and configured to amplify the brightness signal.

64. A display system according to claim 61, wherein the feedback circuit is configured to overdrive the optical cells.

65. A display system according to claim 61, wherein:

the feedback circuit includes a variable signal source to provide a varying signal to the storage elements to adjust the brightnesses of the optical cells; and

the varying signal comprises at least one of an increasing and a decreasing ramp voltage.

66. A display system according to claim 61, wherein:

the feedback circuit includes a variable signal source to provide a varying signal to the storage elements to adjust the brightnesses of the optical cells; and

the varying signal comprises at least one of an increasing and a decreasing step voltage.

67. A display system according to claim 61, wherein:

the feedback circuit comprises a current source to provide a current to the storage elements to adjust the brightnesses of the optical cells; and

the current source provides the current according to a difference between the brightness signal and a target value.

68. A display system according to claim 61, wherein the feedback circuit includes:

a variable signal generator selectively connectable to each storage element to provide a varying signal to each storage element to adjust the value stored in each storage element; and

a current source selectively connectable to each storage element to provide a current to each storage element to adjust the value stored in each storage element.

69. A display system according to claim 68, wherein the variable signal generator and the current source are selectively simultaneously connectable to each storage element.

70. A display system according to claim 61, wherein each sensor includes a resistor connected to a dedicated column to sense the current provided to the column.

71. A display system according to claim 61, wherein each sensor includes a resistor connected to a dedicated column and configured to be selectively connected to each optical cell in the dedicated column to sense the current through the optical cell.

72. A display system according to claim 61, wherein each optical cell further includes a control transistor having a gate connected to the storage element and connected in the current path of the optical element, wherein the control transistor is configured to operate in a subsaturation region.

73. A display system according to claim 61, wherein:

each sensor includes a resistor connected to the optical element in the optical cell; and

the resistor is configured to be selectively connected to the feedback circuit.

74. A display system according to claim 73, wherein :

the optical element includes an OLED; and

the resistor is connected between at least one of (a) a cathode of the OLED and the source of a thin film transistor and (b) an anode of the OLED and ground.

75. A display system according to claim 61, wherein the plurality of sensors includes:

a variable resistor, wherein the resistance of each variable resistor corresponds to the combined brightnesses of multiple optical cells; and

a current source connected to the variable resistor;

wherein the current source supplies only the variable resistor, the brightness signal includes a voltage across the variable resistor, and a sensitivity of the sensor may be increased by increasing the current provided by the current source.

76. A display system according to claim 61, wherein the feedback circuit is configured to store a selected value in the storage element before adjusting the value according to the input signal and the brightness signal.

77. A display system according to claim 61, wherein:

each storage element includes a capacitor for storing a charge; and

the feedback circuit is configured to discharge the capacitor to a substantially known charge before adjusting the value according to the input signal and the brightness signal.

78. A display system according to claim 61, wherein the feedback circuit is further configured to substantially maintain the adjusted value stored on the storage element according to the brightness signal for a remaining duration of a row address cycle.

79. A display system according to claim 61, wherein the feedback circuit:

includes a comparison circuit to compare the brightness signal to a target value; and

is configured to maintain the brightness of the at least one of the optical cells within a selected range of or identical to the target value.

80. A display system according to claim 61, wherein the feedback circuit:

includes a power source and a power sink; and

is configured to adjust the value according to the brightness signal by selectively connecting each storage element to the power source and the power sink.

81. A display system according to claim 61, wherein:

each sensor senses a first signal corresponding to a brightness of a first optical cell and a second signal corresponding to the brightness of a second optical cell in the particular column; and

the feedback circuit independently adjusts the value of the first optical cell's storage element according to the first signal and the value of the second optical cell's storage element according to the second signal.

82. A display system according to claim 61, wherein the display panel comprises a liquid crystal display panel.

83. A display system according to claim 82, wherein the sensor comprises a node connected to an electrode of a liquid crystal cell.

84. A display system according to claim 61, wherein the feedback circuit includes a variable signal source to simultaneously provide a varying signal to the storage elements in multiple columns to adjust the individual values stored on the storage elements.

85. A display system according to claim 61, wherein each sensor is configured to sense a sequential signal corresponding to brightnesses of multiple optical cells in the particular column.

86. A display system according to claim 61, wherein each sensor is configured to sense a brightness sum signal corresponding to the sum of the brightnesses of multiple optical cells in the column.

87. A display system according to claim 86, wherein the feedback circuit is configured to determine the brightness of a single optical cell in the particular column according to a change in the brightness sum signal.

88. A display system according to claim 61, wherein:

each sensor includes a light sensor responsive to multiple optical cells in the particular column; and

the light sensor provides a brightness sum signal corresponding to the sum of the brightnesses of the multiple optical cells in the column.